

Claims

1. Process for processing electric components, especially semiconductor chips (2), which (components) are releasably held as a group of at least two components (2) with a first side on a first carrier material (3) of a first carrier (4), characterized in that the first carrier material (3) is separated from the first carrier (4) in an edge area not occupied by the components (2),
the section (3') of the first carrier material (3) with the components (2) is placed on a first transporter and
the components (2) are then removed or pulled off of the first carrier material (3') for placing to a placing area (3a, 4a, 44).
2. Process according to claim 1, characterized in that the components (2) are then removed multiply from the first carrier material (3') for placing on a placing area (3a, 4a, 44).
3. Process according to claim 1 or 2, characterized in that the section (3') of the first carrier material (3) with the components (2) is placed with a side facing away from the components on the first transporter (6).
4. Process according to one of the foregoing claims, characterized in that the first carrier is a carrier frame (4) with the first carrier material (3).
5. Process according to one of the foregoing claims, characterized in that the second carrier is a second carrier material (3a) held in a second carrier frame (4a).
6. Process according to one of the foregoing claims, characterized in that the placing of the components (2) on the second carrier (3a, 4) takes place singly.
7. Process according to one of the foregoing claims, characterized in that the placing of

the components (2) on the second carrier (3a, 4) takes place multiply, i.e. as a group or sub-group.

8. Process according to one of the foregoing claims, characterized in that the group of components is formed by a semiconductor wafer (1), which is separated into a plurality of semiconductor chips (2) located on the first carrier material (3).
9. Process according to one of the foregoing claims, characterized in that the flipping takes place on a transport belt (7) forming the first transporter (6) on which (belt) the components (2) are moved by means of a flipping unit (16) from a feed position (5) to a separating and transfer position (23).
10. Process according to claim 9, characterized in that the transport belt (7) forming the first transporter (6) is made of a self-adhesive transport foil.
11. Process according to one of the foregoing claims, characterized in that the separation of the components (2) at the separating or transfer position (23) takes place in that the transport belt (7) forming the first transporter (6) is pulled off of the components (2) held with their second side on the second carrier (3a, 4a) together with the sections (3') of the first carrier material (3).
12. Process according to claim 11, characterized in that the removal by deflecting the transport belt (7) forming the first transporter (6) takes place at a deflection edge (25) extending crosswise or perpendicular to a transport direction (A) of the first transporter (6).
13. Process according to one of the foregoing claims, characterized in that the second carriers (3a, 4a) are provided on a second transporter (17) at the separating and transfer position (23), preferably for transfer of each group of components (2) to a separate second carrier (3a, 4a).

14. Process according to one of the foregoing claims, characterized in that the second carriers with the sections (3') of the first carrier material (3) or with the groups of components (2) located on these sections are consolidated before reaching the separating and transfer station (23) so that the components (2) already bear with their second side against one of the second carriers (3a, 4a) when the separating and transfer station (23) is reached.
15. Process according to one of the foregoing claims, characterized in that with the use of first carriers in the form of a carrier frame (4) and a carrier foil (3) held in this carrier frame, the carrier foil is separated from the carrier frame (4) by a separating device (15) in an area surrounding the components (2) and the section (3') of the carrier foil (3) with the components (2) is placed on the first transporter (6).
16. Process according to one of the foregoing claims, characterized in that the components (2) are transferred at the separating or transfer position (23a) as at least one component row (R) to a placing area (35), from which the components (2) are picked up by means of a pick-up unit (39).
17. Process according to claim 16, characterized in that at least two component rows (R) are transferred in one step at the separating and transfer position (23a) to the placing area (35).
18. Process according to claim 16 or 17, characterized in that a plurality of components (2), preferably all components of at least one component row (R) or components (2) of a group of several components are picked up from the placing area (35) simultaneously by the pick-up unit (39).
19. Process according to one of the foregoing claims, characterized in that at the placing area (35) components (2) of at least two component rows (R) are picked up

simultaneously with the pick-up unit (39) and that before placing the components the distance of the rows formed at the pick-up unit is increased.

20. Process according to one of the foregoing claims, characterized in that the components (2) on the first transporter (6) in the transport direction (F) of this transporter all have the same length.
21. Process according to one of the foregoing claims, characterized in that the components picked up by the first transporter (6) are transferred by means of at least one transporter (44) and/or one flipping unit (45) to pick-ups (47) of a third transporter (46).
22. Process according to one of the foregoing claims, characterized in that a carrier foil remainder (3') with the components is cut out of the carrier foil (3) carrying the components (2), whereby the carrier foil remainder (3') has a circular or rectangular or square profile.
23. Apparatus for processing electric components (2), especially semiconductor chips (2), which (components) are releasably held as a group of at least two components (2) with a first side on a first carrier material (3) of a first carrier (4), characterized by means (10, 53) for separating one section (3') of the first carrier material (3) carrying a group of components (2) and for placing this section (3') on a transport surface of a first transporter (6) at a feed station (5), whereby the first transporter (6) or its transport surface can be moved between the feed station (5) and a separation or transfer station (23), and by means at the separating or transfer station (23, 23a) for removing or separating the components (2) from the section (3') of the first carrier material (3) carrying the components (2) for placing the components (2) on a placing area (3a, 4a, 44).

- 24.Apparatus according to claim 23, characterized in that the separating or transfer station (23) is designed so that the placing of the components (2) on the second carrier (3a, 4) takes place singly.
- 25.Apparatus according to claim 23, characterized in that the separating or transfer station (23) is designed so that the placing of the components (2) on the second carrier (3a, 4) takes place multiply, i.e. as a group or sub-group.
- 26.Apparatus according to one of the foregoing claims, characterized in that the first transporter has a transport belt (7).
- 27.Apparatus according to claim 26, characterized in that the transport belt (7) is designed to be self-adhesive on one side forming the transport surface, preferably by a self-adhesive foil.
- 28.Apparatus according to one of the foregoing claims, characterized by a second transporter (17) for feeding the second carrier (3a, 4a) to the separating and transfer station (23).
- 29.Apparatus according to one of the foregoing claims, characterized in that if the first transporter (6) is designed in the form of a self-adhesive transport belt (7), means for deflecting the transport belt (7) by at least 90° or more are provided at the separating or transfer station (23) for releasing the components (2) from the transport belt (7) or from the remainder (3') of the first carrier material (3).
- 30.Apparatus according to claim 29, characterized in that the means for deflecting are formed by a deflecting edge (25).
- 31.Apparatus according to claim 30, characterized in that projections (27) are provided on the deflection edge (25) that extend beyond the latter and

function to hold down the components (2).

32.Apparatus according to one of the foregoing claims, characterized in that connected to the separating and transfer position (23a) a placing area (35) is provided for at least one component row (R) and that a pick-up element (39) is provided for picking up the components (2), preferably for picking up the entire component row (R) or for the simultaneous pick-up of a component group comprising a plurality of components (2).

33.Apparatus according to claim 32, characterized in that the pick-up unit is formed by at least two holders (40) and that the holders (40) can be moved relative to each other in order to increase the distance (x, X).

34.Apparatus according to claim 33, characterized in that each holder (40) forms fixtures or bearing surfaces (41) for several components (2).

35.Apparatus according to claim 33 or 34, characterized in that the holders are vacuum holders (40).

36.Apparatus according to one of the foregoing claims, characterized in that the means for separating an element (3') from the first carrier material carrying a group of components (2) and for placing this element (3') onto the transport surface of the first transporter (6) are formed by a suction head (10', 53') with a cutting or separating unit (15, 56, 59).

37.Apparatus according to claim 36, characterized in that the cutting or separating unit is an endless driven belt (56) with at least one cutting edge.

38.Apparatus according to claim 36 or 37, characterized in that the belt (56) is guided over several rollers (57) on the suction head (53') to form an essentially rectangular

or square loop.